

US005646997A

## United States Patent [19]

Barton

[11]

Patent Number:

5,646,997

[45]

Date of Patent:

Jul. 8, 1997

[54] METHOD AND APPARATUS FOR  
EMBEDDING AUTHENTICATION  
INFORMATION WITHIN DIGITAL DATA

[76] Inventor: James M. Barton, 101 Sund Ave., Los  
Gatos, Calif. 95032

[21] Appl. No.: 357,713

[22] Filed: Dec. 14, 1994

[51] Int. Cl. <sup>6</sup> ..... H04L 9/00

[52] U.S. Cl. ..... 380/23; 380/25; 380/30;  
380/49

[58] Field of Search ..... 380/2, 23, 25,  
380/30, 49

## [56] References Cited

## U.S. PATENT DOCUMENTS

4,639,548 1/1987 Oshima et al. ..... 380/2 X

## OTHER PUBLICATIONS

"[Argent] digital watermark system," 1995, DICE Corp.  
"[Image] Download MS Word Version", No Date, No Publisher.

"NEC's 'watermark' tech aimed at Web" by George Leopold.

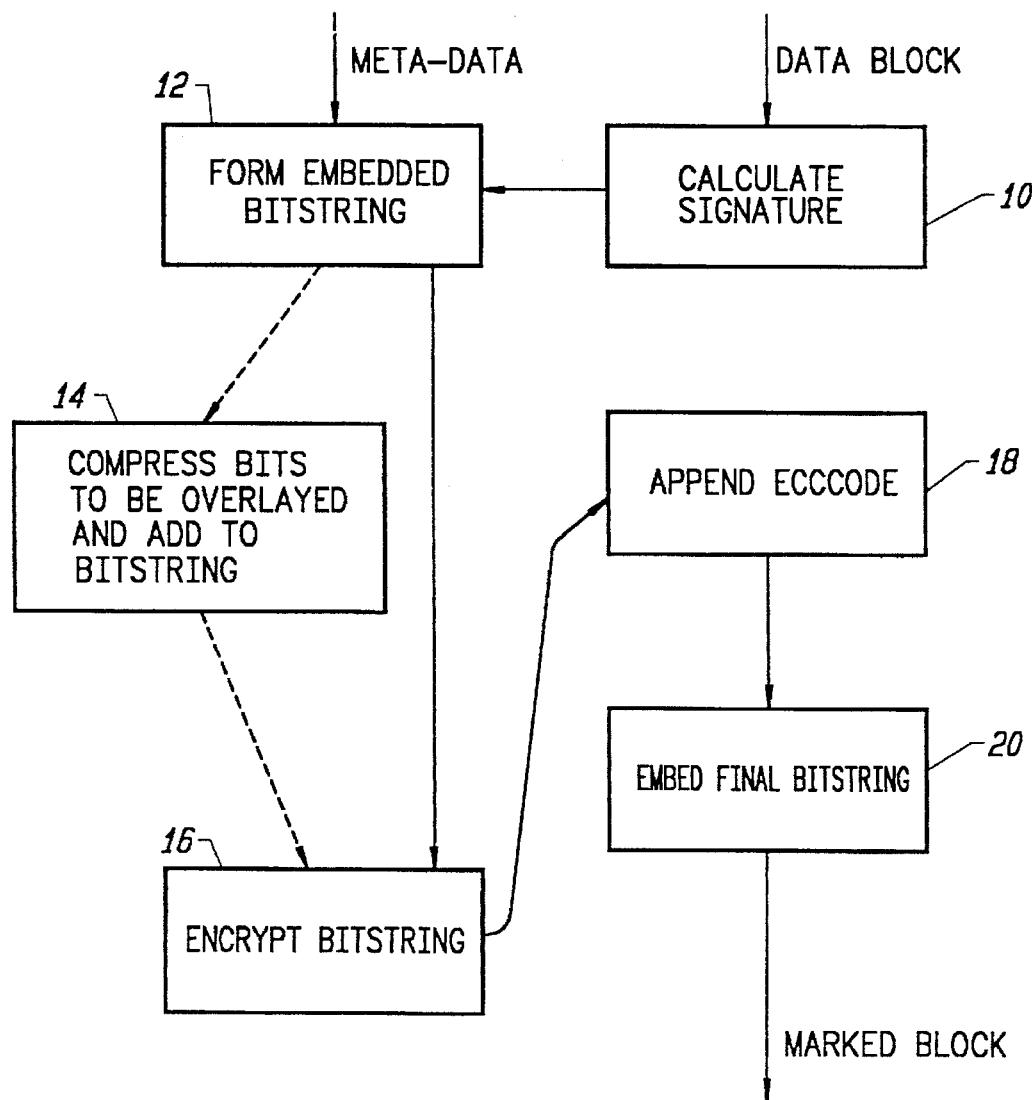
Primary Examiner—Bernarr E. Gregory  
Attorney, Agent, or Firm—Michael A. Glenn

[57]

## ABSTRACT

Arbitrary digital information is embedded within a stream of digital data, in a way that avoids detection by a casual observer and that allows a user to determine whether the digital data have been modified from their intended form. The embedded information may only be extracted as authorized and may be used to verify that the original digital data stream has not been modified.

20 Claims, 3 Drawing Sheets





US005912972A

## United States Patent [19]

Barton

[11] Patent Number:

5,912,972

[45] Date of Patent:

Jun. 15, 1999

## [54] METHOD AND APPARATUS FOR EMBEDDING AUTHENTICATION INFORMATION WITHIN DIGITAL DATA

[75] Inventor: James M. Barton, Los Gatos, Calif.

[73] Assignee: Sony Corporation, Japan

[21] Appl. No.: 08/824,174

[22] Filed: Mar. 26, 1997

## Related U.S. Application Data

[63] Continuation of application No. 08/357,713, Dec. 14, 1994, Pat. No. 5,646,997.

[51] Int. Cl.<sup>6</sup> H04L 9/00

[52] U.S. Cl. 380/23; 380/25; 380/30; 380/49; 380/50; 380/54

[58] Field of Search 380/2, 4, 5, 10, 380/23, 25, 30, 49, 50, 54, 59

## [56] References Cited

## U.S. PATENT DOCUMENTS

4,433,207	2/1984	Best	380/4
4,639,548	1/1987	Oshima et al.	380/2 X
4,750,173	6/1988	Blüthgen	
4,943,973	7/1990	Werner	
4,969,041	11/1990	O'Grady et al.	
5,161,210	11/1992	Druyvesteyn et al.	
5,200,822	4/1993	Bronfin et al.	
5,243,423	9/1993	DeJean et al.	
5,319,735	6/1994	Preuss et al.	
5,327,237	7/1994	Gerdes et al.	

5,387,941	2/1995	Montgomery et al. .
5,450,490	9/1995	Jensen et al. .
5,530,751	6/1996	Morris ..... 380/4
5,539,471	7/1996	Myhrvold et al. .
5,557,333	9/1996	Jungo et al. .
5,568,570	10/1996	Rabbani .
5,572,247	11/1996	Montgomery et al. .
5,574,962	11/1996	Fardeau et al. .
5,579,124	11/1996	Aijala et al. .
5,581,800	12/1996	Fardeau et al. .
5,587,743	12/1996	Montgomery et al. .
5,606,609	2/1997	Houser et al. ..... 380/4
5,636,995	6/1997	Sharpe, III et al. .
5,671,277	9/1997	Ikenoue et al. ..... 380/4 X
5,778,102	7/1998	Sandford, II et al. .

## FOREIGN PATENT DOCUMENTS

0 581 317 A2	2/1994	European Pat. Off. .
0 651 554 A1	5/1995	European Pat. Off. .
9520291	7/1995	WIPO .

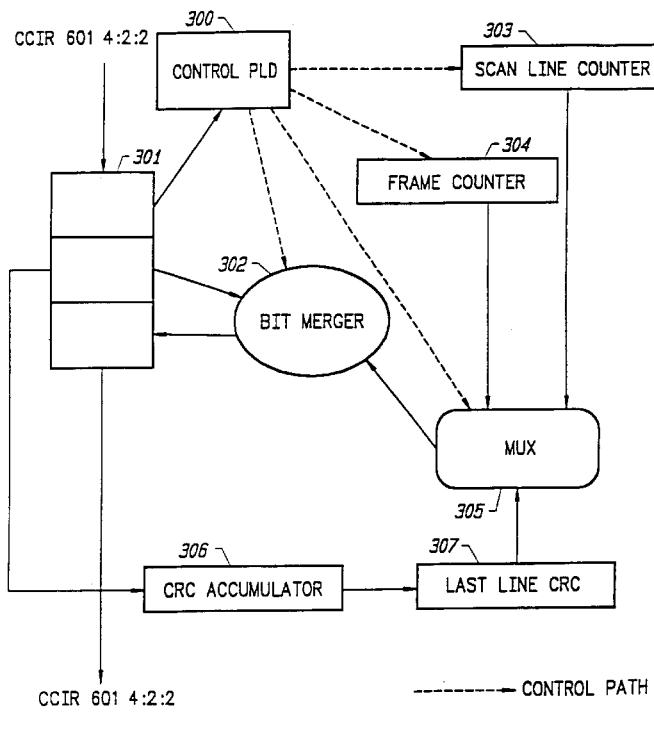
Primary Examiner—Bernarr E. Gregory

Attorney, Agent, or Firm—Lerner, David, Littenberg, Krumholz &amp; Mentlik, LLP

[57] ABSTRACT

Arbitrary digital information is embedded within a stream of digital data, in a way that avoids detection by a casual observer and that allows a user to determine whether the digital data have been modified from their intended form. The embedded information may only be extracted as authorized and may be used to verify that the original digital data stream has not been modified.

8 Claims, 3 Drawing Sheets





US006233684B1

(12) **United States Patent**  
**Stefik et al.**

(10) **Patent No.:** **US 6,233,684 B1**  
(45) **Date of Patent:** **May 15, 2001**

(54) **SYSTEM FOR CONTROLLING THE DISTRIBUTION AND USE OF RENDERED DIGITAL WORKS THROUGH WATERMAKING**

(75) **Inventors:** **Mark J. Stefik**, Portola Valley; **Glen W. Petrie**, Los Gatos; **Steve A. Okamoto**, Torrance; **Nicholas H. Briggs**, Palo Alto, all of CA (US)

(73) **Assignee:** **Contenaguard Holdings, Inc.**,  
Wilmington, DE (US)

(\*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** **08/948,893**

(22) **Filed:** **Oct. 10, 1997**

**Related U.S. Application Data**

(60) Provisional application No. 60/039,275, filed on Feb. 28, 1997.

(51) **Int. Cl.<sup>7</sup>** **H04N 7/167**

(52) **U.S. Cl.** **713/176; 380/9; 380/54**

(58) **Field of Search** **380/51, 52, 55, 380/4, 54; 382/232; 713/176**

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

3,263,158	7/1966	Bargen et al.	323/44
4,529,870	7/1985	Chaum	235/380
4,658,093	4/1987	Hellman	380/25
4,924,378	5/1990	Hershey et al.	364/200
4,932,054	6/1990	Chou et al.	380/4
4,937,863	6/1990	Robert et al.	380/4
4,953,209	8/1990	Ryder, Sr. et al.	380/23
4,961,142	10/1990	Elliott et al.	364/408
4,977,594	12/1990	Shear	380/4
5,010,571	4/1991	Katznelson	380/40
5,014,234	5/1991	Edwards, jr.	364/900
5,023,907	6/1991	Johnson et al.	380/4
5,047,928	9/1991	Wiedemer	364/406

5,050,213	9/1991	Shear	380/25
5,058,164	10/1991	Elmer et al.	380/50
5,103,476	4/1992	Waite	380/4

(List continued on next page.)

**FOREIGN PATENT DOCUMENTS**

0 332 707 A1	9/1989 (EP) .
2 236 604	4/1991 (GB) .
WO 92/20022	11/1992 (WO) .
WO 93/01550	1/1993 (WO) .

**OTHER PUBLICATIONS**

Press Release From Electronic Publishing Resources, Inc. (EPR) entitled "National Semiconductor and EPR Partner for Information Metering/Data Security Cards", dated Mar. 4, 1994.

(List continued on next page.)

**Primary Examiner**—Thomas R. Peeso

**Assistant Examiner**—Todd Jack

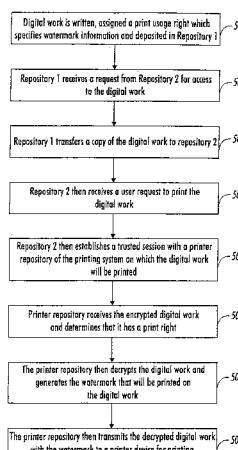
(74) **Attorney, Agent, or Firm**—Nixon Peabody LLP; Marc S. Kaufman

(57)

**ABSTRACT**

A trusted rendering system for use in a system for controlling the distribution and use of digital works. A trusted rendering system facilitates the protection of rendered digital works which have been rendered on a system which controls the distribution and use of digital works through the use of dynamically generated watermark information that is embedded in the rendered output. The watermark data typically provides information relating to the owner of the digital work, the rights associated with the rendered copy of the digital work and when and where the digital work was rendered. This information will typically aid in deterring or preventing unauthorized copying of the rendered work to be made. The system for controlling distribution and use of digital works provides for attaching persistent usage rights to a digital work. Digital works are transferred between repositories which are used to request and grant access to digital works. Such repositories are also coupled to credit servers which provide for payment of any fees incurred as a result of accessing a digital work.

**28 Claims, 13 Drawing Sheets**





US006453252B1

(12) **United States Patent**  
**Laroche**

(10) **Patent No.:** **US 6,453,252 B1**  
(45) **Date of Patent:** **Sep. 17, 2002**

(54) **PROCESS FOR IDENTIFYING AUDIO CONTENT**

4,230,990 A 10/1980 Lert, Jr. et al. .... 455/67  
5,581,658 A \* 12/1996 O'Hagan et al. .... 395/22  
5,619,616 A \* 4/1997 Brady et al. .... 395/22  
6,266,003 B1 \* 7/2001 Hock .... 341/155

(75) Inventor: **Jean Laroche**, Santa Cruz, CA (US)

(73) Assignee: **Creative Technology Ltd.**, Singapore (SG)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/570,679**

(22) Filed: **May 15, 2000**

(51) Int. Cl.<sup>7</sup> .... **G06F 17/00**

(52) U.S. Cl. .... **702/75; 702/73**

(58) Field of Search .... 702/57, 71, 73, 702/75; 73/432.1; 116/1; 324/76.12, 76.19; 381/124; 386/75, 96

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,919,479 A 11/1975 Moon et al. .... 179/1 SB

OTHER PUBLICATIONS

Pfeiffer, S. et al., "Automatic Audio Content Analysis" ACM Multimedia '96, ACM Multimedia, Boston, MA ACM 0-89791-871-1/96/11.

\* cited by examiner

Primary Examiner—John S. Hilten

Assistant Examiner—Douglas N Washburn

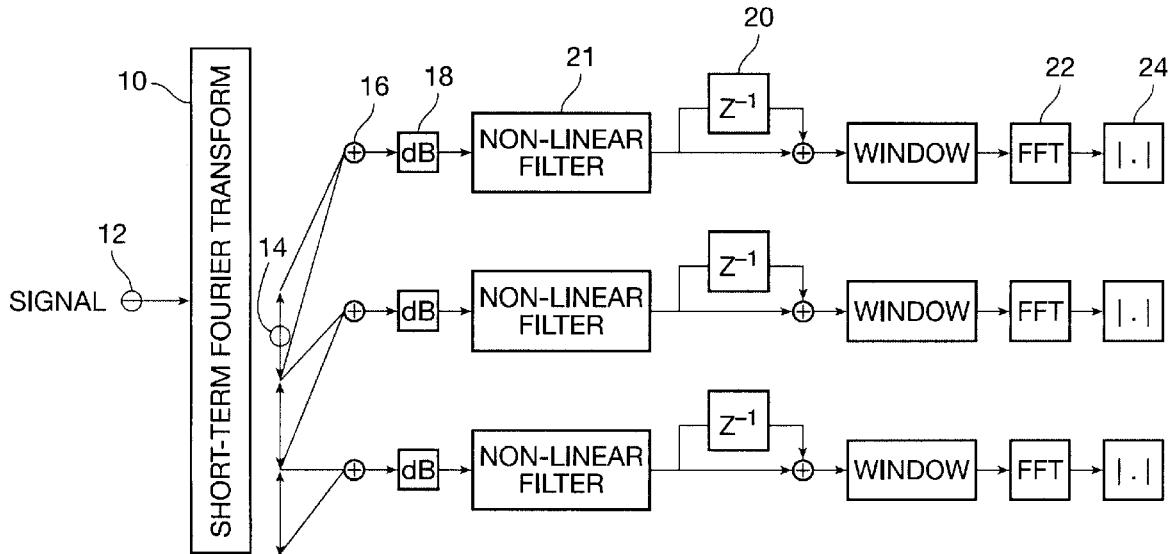
(74) Attorney, Agent, or Firm—Townsend and Townsend and Crew LLP

(57)

**ABSTRACT**

A fingerprint of an audio signal is generated based on the energy content in frequency subbands. Processing techniques assure a robust identification fingerprint that will be useful for signals altered subsequent to the generation of the fingerprint. The fingerprint is compared to a database to identify the audio signal.

**10 Claims, 1 Drawing Sheet**





US006405203B1

(12) **United States Patent**  
**Collart**

(10) **Patent No.:** **US 6,405,203 B1**  
(45) **Date of Patent:** **Jun. 11, 2002**

(54) **METHOD AND PROGRAM PRODUCT FOR PREVENTING UNAUTHORIZED USERS FROM USING THE CONTENT OF AN ELECTRONIC STORAGE MEDIUM**

(75) **Inventor:** **Todd R. Collart, Los Altos, CA (US)**

(73) **Assignee:** **Research Investment Network, Inc., Irvine, CA (US)**

(\*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** **09/295,689**

(22) **Filed:** **Apr. 21, 1999**

(51) **Int. Cl.:** **G06F 15/173**

(52) **U.S. Cl.:** **707/10; 707/104; 705/26; 709/203; 709/219; 382/205**

(58) **Field of Search:** **707/3, 9, 10, 104, 707/513, 102; 713/155, 200; 711/152, 205; 705/26, 23, 18; 709/203, 219; 382/103**

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

4,709,813 A	12/1987	Wildt
4,710,754 A	12/1987	Montean
4,967,185 A	10/1990	Montean
5,128,752 A	7/1992	VonKohrn
5,305,195 A	4/1994	Murphy
5,305,197 A	4/1994	Axler et al.
5,347,508 A	9/1994	Montbriand et al.
5,353,218 A	10/1994	DeLapa et al.
5,420,403 A	5/1995	Allum et al.
5,483,658 A	* 1/1996	Grube et al.
5,651,064 A	* 7/1997	Newell
5,696,898 A	* 12/1997	Baker et al.
5,751,672 A	5/1998	Yankowski
5,804,810 A	9/1998	Woolley et al.
5,822,291 A	10/1998	Brindze et al.
5,869,819 A	* 2/1999	Knowles et al.
5,893,910 A	* 4/1999	Martineau et al.
6,006,328 A	* 12/1999	Drake
6,035,329 A	3/2000	Mages et al.
6,064,979 A	* 5/2000	Perkowski
		705/26

6,076,733 A	* 6/2000	Wilz, Sr. et al.	235/462.01
6,097,291 A	* 8/2000	Tsai et al.	340/572.6
6,154,738 A	* 11/2000	Call	707/4
6,246,778 B1	* 6/2001	Moore	382/103

**FOREIGN PATENT DOCUMENTS**

EP	0762422	8/1996
EP	0802527	10/1996
EP	0814419	6/1997
EP	0853315	1/1998
WO	9847080	10/1998
WO	9858368	12/1998

**OTHER PUBLICATIONS**

Mascha M et al: "Interactive education: Transitioning CD-ROMS to the Web" Computer Networks and ISDN Systems, NL, North Holland Publishing, Amsterdam, vol. 27, No. 2, Nov. 1, 1994, pp. 267 through 272.

European Patent Office, Patent Abstracts of Japan: Publication No. 10063562, Publication date Jun. 03, 1998; Application Date Aug. 21, 1996, Application No. 08219994; Applicant Hitachi Ltd; Inventor Kuwabara Teiji; Int. Cl. G06F 12/00 G06F13/00 G06F 13/00; Title: Package Medium, Electronic Mail and Terminal Equipment.

\* cited by examiner

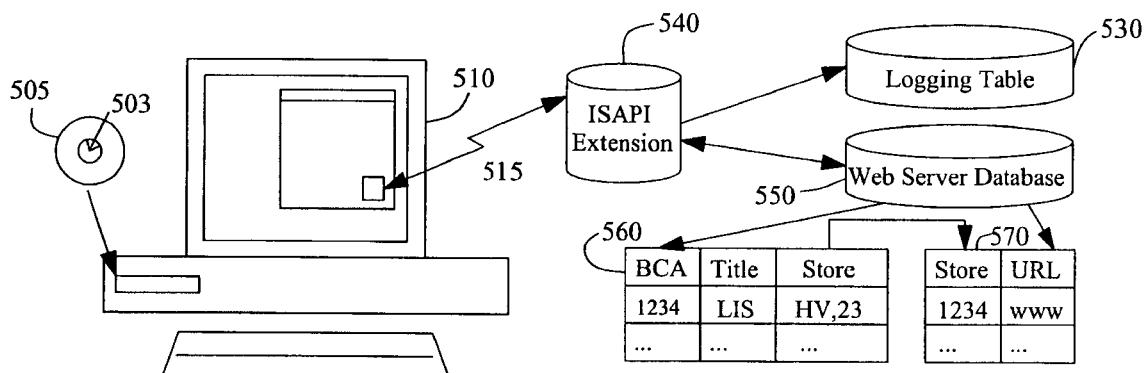
**Primary Examiner**—Jean R. Homere

(74) **Attorney, Agent, or Firm:** Keiji Masaki; Steve A. Wong

(57) **ABSTRACT**

A system, method, and article of manufacture is provided for tracking the distribution of content electronically. First, an electronic storage medium tracking identifier is incorporated onto an electronic storage medium and stored on a database. Next, a package tracking identifier is situated onto a package in which the electronic storage medium is stored. The electronic storage medium is then tracked while being shipped between various entities using the tracking identifier on the package. Further, the electronic storage medium may be identified using the tracking identifier on the electronic storage medium in order to afford various advertising, security, support, or retail-related features.

**20 Claims, 24 Drawing Sheets**





US006665489B2

**(12) United States Patent  
Collart**

**(10) Patent No.: US 6,665,489 B2  
(45) Date of Patent: \*Dec. 16, 2003**

**(54) SYSTEM, METHOD AND ARTICLE OF  
MANUFACTURING FOR AUTHORIZING  
THE USE OF ELECTRONIC CONTENT  
UTILIZING A LASER-CENTRIC MEDIUM  
AND A NETWORK SERVER**

**(75) Inventor: Todd R. Collart, Los Altos, CA (US)**

**(73) Assignee: Research Investment Network, Inc.,  
Irvine, CA (US)**

**(\*) Notice:** This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

**(21) Appl. No.: 09/295,964**

**(22) Filed: Apr. 21, 1999**

**(65) Prior Publication Data**

US 2003/0133702 A1 Jul. 17, 2003

**(51) Int. Cl.<sup>7</sup> ..... H04N 5/91; H04N 5/85**

**(52) U.S. Cl. ..... 386/94; 386/46; 386/125**

**(58) Field of Search ..... 386/94, 125, 126,  
386/105, 106, 104, 52, 46, 45, 39, 40, 4,  
1, 124, 55, 60, 95; H04N 5/91, 5/85**

**(56) References Cited**

**U.S. PATENT DOCUMENTS**

4,709,813 A	12/1987	Wildt
4,710,754 A	12/1987	Montean
4,967,185 A	10/1990	Montean
5,023,907 A	6/1991	Johnson et al.
5,128,752 A	7/1992	Von Kohorn
5,305,195 A	4/1994	Murphy
5,305,197 A	4/1994	Axler et al.
5,347,508 A	9/1994	Montbriand et al.

(List continued on next page.)

**FOREIGN PATENT DOCUMENTS**

DE	42 42 992 A1	6/1994
EP	0 372 716 A2	6/1990
EP	0762422	8/1996
EP	0802527	10/1996
EP	0814419	6/1997
EP	809244 A2	11/1997
EP	0853315	1/1998
EP	0 849 734 A2	6/1998
EP	0853315 A2 *	7/1998
JP	11039262 A	12/1999
WO	9847080	10/1998
WO	9858368	12/1998
WO	99/14678	3/1999
WO	WO 00/02385	1/2000
WO	WO 00/08855	2/2000
WO	WO 00/16229	3/2000
WO	WO 00/18054	3/2000
WO	WO 00/24192	4/2000

**OTHER PUBLICATIONS**

Mascha M et al: "Interactive education: Transitioning CD-ROMS to the Web" Computer Networks and ISDN Systems, NL, North Holland Publishing. Amsterdam, vol 27, No. 2, Nov. 1, 1994, pp. 267 through 272.

(List continued on next page.)

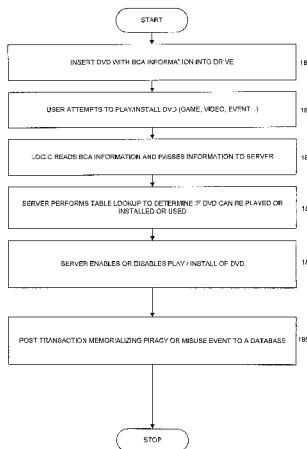
**Primary Examiner—Robert Chevalier**

**(74) Attorney, Agent, or Firm—Keiji Masaki; Steve A. Wong; Caroline T. Do**

**ABSTRACT**

A system, method, and article of manufacture is provided for tracking the distribution of content electronically. First, an electronic storage medium tracking identifier is incorporated onto an electronic storage medium and stored on a database. Next, a package tracking identifier is situated onto a package in which the electronic storage medium is stored. The electronic storage medium is then tracked while being shipped between various entities using the tracking identifier on the package. Further, the electronic storage medium may be identified using the tracking identifier on the electronic storage medium in order to afford authorized use of the information contained on the electronic storage medium.

**10 Claims, 24 Drawing Sheets**





US005629980A

# United States Patent [19]

Stefik et al.

[11] Patent Number: 5,629,980

[45] Date of Patent: May 13, 1997

[54] **SYSTEM FOR CONTROLLING THE DISTRIBUTION AND USE OF DIGITAL WORKS**

[75] Inventors: **Mark J. Stefik**, Woodside; **Michalene M. Casey**, Morgan Hill, both of Calif.

[73] Assignee: **Xerox Corporation**, Stamford, Conn.

[21] Appl. No.: **344,042**

[22] Filed: **Nov. 23, 1994**

[51] Int. Cl. <sup>6</sup> **H04L 9/00**

[52] U.S. Cl. **380/4**

[58] Field of Search **380/4; 235/380**

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,263,158	7/1966	Janis	380/4
4,529,870	7/1985	Chaum	235/380
4,658,093	4/1987	Hellman	380/25
4,924,378	5/1990	Hershey et al.	364/200

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

0332707	9/1989	European Pat. Off.	.
2236604	4/1991	United Kingdom	.
WO9220022	11/1992	WIPO	.
9301550	1/1993	WIPO	G06F 11/34

OTHER PUBLICATIONS

Press Release From Electronic Publishing Resources, Inc. (EPR) entitled "National Semiconductor and EPR Partner for Information Metering/Data Security Cards", dated Mar. 4, 1994.

Weber, R., "Digital Rights Management Technology", Oct. 1995.

European Search Report for Corresponding European Application 95308420.9.

(List continued on next page.)

Primary Examiner—Salvatore Cangialosi  
Attorney, Agent, or Firm—Richard B. Domingo

[57] **ABSTRACT**

A system for controlling use and distribution of digital works. In the present invention, the owner of a digital work attaches usage rights to that work. Usage rights are granted by the "owner" of a digital work to "buyers" of the digital work. The usage rights define how a digital work may be used and further distributed by the buyer. Each right has associated with it certain optional specifications which outline the conditions and fees upon which the right may be exercised. Digital works are stored in a repository. A repository will process each request to access a digital work by examining the corresponding usage rights. Digital work playback devices, coupled to the repository containing the work, are used to play, display or print the work. Access to digital works for the purposes of transporting between repositories (e.g. copying, borrowing or transfer) is carried out using a digital work transport protocol. Access to digital works for the purposes of replay by a digital work playback device (e.g. printing, displaying or executing) is carried out using a digital work playback protocol.

31 Claims, 13 Drawing Sheets

